CENTRAL BANK CREDIBILITY AND GOVERNMENT REGULATION: A PARADOX?

T E S I S

Untuk Memenuhi Persyaratan
Mencapai Gelar Magister

Oleh:

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PROGRAM MAGISTER ILMU EKONOMI
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Dipertahankan di depan penguji
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Abstract

Juwita Purnami Restu Suwondo. Pascasarjana Fakultas Ekonomi dan Bisnis Universitas Brawijaya. **Central Bank Credibility and Government Regulation: A Paradox?**. Ketua Pembimbing: Prof. Munawar Ismail, SE, DEA, PHD. Komisi Pembimbing: Dr. Rern-Jay Hung.

The purpose of this paper is to understand how the regulation affects central bank credibility through inflation rate, and to investigate whether or not a paradox really exists between those two regulations. This research took place in Central Bank of Indonesia because the secondary data was taken from Central Bank of Indonesia, with partly obtained from Central Bureau of Statistic (BPS), and World Economic Outlook IMF (International Monetary Fund. The data gathered in this research is secondary, which published officially by Central Bank of Indonesia, International Monetary Fund (IMF), and Central Bureau of Statistics (BPS), from 2007 to 2013. The method of Three Stage Least Squares (3SLS) estimation is being used in this thesis. The model (both inflation and credibility equations) provided evidences that suggested that there is indeed a negative relationship between government regulation and the central bank credibility in Indonesia. It indicates that as the import agreement (ACFTA) is being held, and the import quota becomes higher, the central bank credibility turned out to be lower, through its impact on the inflation rate.

Keywords: inflation, credibility, ACFTA, regulation

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Chapter I

INTRODUCTION

1.1 Background

In so far as ‘credibility’ is understood in this ordinary English sense, it would be bizarre to favor ‘incredible’ or ‘non-credible’ over ‘credible’ monetary policy. Approval is one thing that is conveyed through the word “credible”, no matter the kind of form it takes. So far, research conducted about central bank credibility is almost always built from macroeconomics indicators that Taylor had created in the late 1993. Linear equations often run until 2011, including Waluyo, et al, had performed about the credibility of the Central Bank of Indonesia. Though in fact, non linear equation model is already investigated by Neuenkirch, et al in the last 2012. Several other researches had been conducted from all around the world, and explored from various perspectives, from how the model should be until what are the best indicators that can explain better, etc. But none of the above had chosed a path to dig the issue from agricultural side, through government regulation, regarding the food price problems.

Back to the very basic issue on this matter, central bank credibility is indeed what spends energy and time for all the monetary policy makers. A central bank can be considered as credible when the actual inflation matches the target rate that the bank released as an official statement. The more credible the central bank is, the more economic agents would be willing to follow its lead concerning inflation rate controlling. And that, without a doubt, is the dream for all central banks, to have the economic agents to help succeeding the goal of the monetary policy.

Because as we all know, the lag that exists in every form of government policy is dragging enough in the transmission mechanism, let alone if the people do not obey and react in the favor way for central bank. The lower the central bank credibility is, the less trust people would be giving in the future and that can ultimately lead to the next level of nightmare: inflation persistence (Forder, 2004; Waluyo, 2011; Henckel, 2013, Tanaka, 2013).

Tabel 1.1: **INFLATION RATE DURING 2007-2013**

	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
	inflation	**inflation**	**inflation**	**inflation**	**inflation**	**inflation**	**inflation**
Jan	1.04	1.77	-0.07	0.84	0.89	0.76	1.03
Feb	0.62	0.65	0.21	0.3	0.13	0.05	0.75
Mar	0.24	0.95	0.22	-0.14	-0.32	0.07	0.63
Apr	-0.16	0.57	-0.31	0.15	-0.31	0.21	-0.1
May	0.1	1.41	0.04	0.29	0.12	0.07	-0.03
June	0.23	2.46	0.11	0.97	0.55	0.62	1.03
July	0.72	1.37	0.45	1.57	0.67	0.7	3.29
Agt	0.75	0.51	0.56	0.76	0.93	0.95	1.12
Sep	0.8	0.97	1.05	0.44	0.27	0.01	-0.35
Okt	0.79	0.45	0.19	0.06	-0.12	0.16	0.09
Nov	0.18	0.12	-0.03	0.6	0.34	0.07	0.12
Dec	1.1	-0.04	0.33	0.92	0.57	0.54	N.A
Yearly	**6.59**	**11.06**	**2.78**	**6.96**	**3.79**	**4.3**	

Source: Central Bureau of Statistics Indonesia, 2013

For the past six years, inflation fluctuated a lot in Indonesia. It can be seen clearly from Table 1 that it experienced an immense move especially on the 2008 global financial crash. From 2010 onwards, the fluctuation calmed down a little bit.

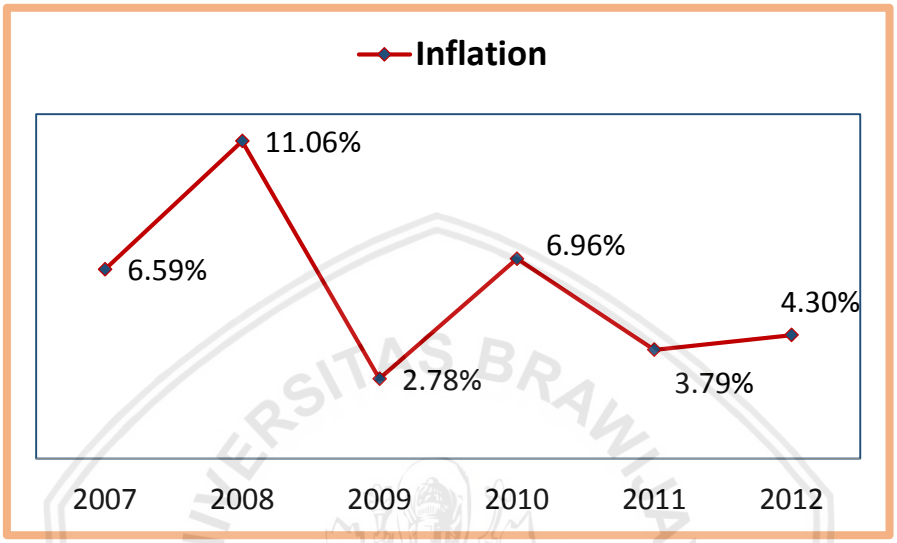


Figure 1.1: **Inflation Rate During 2007-2013 Period**

Source: Central Bureau of Statistics Indonesia, 2013 (modified)

Central bank, in the case of Indonesia, is an independent institution in the country. That is not the overstatement of the century, as it's actually a government institution that hold an equal position with another government elite institutions, such as The Parliament, Financial Investigators (BPK), and even the Supreme Court. The chair the Central Bank of Indonesia is sitting on isn't on the equal level of The Financial Department because CBI (Central Bank of Indonesia) is an elite institutions *outside* the government. The power and position CBI holds is necessary in order to maintain its role and function as a Monetary Authority with more efficiently and effectively (Central Bank of Indonesia, 2013). In other words, it's the main characteristics of a central bank to not operating under control of a system or getting wrapped around its little finger, as its primary purpose is to make proper

monetary policies work in the country. Milton Friedman was one of the front liners in supporting the central bank independency and it seems like CBI also rides the in same boat.

But it's not a mere credibility that holds responsibility for the national welfare in Indonesia. Though enjoying a high level of credibility means all is good and well, and the central bank can control the monetary sector as one anticipate, the welfare would still go down if the output stability is quite low, and thus the chance of welfare would diminish, or even gone negative. Bottom line, high output level plus under-control inflation and stable exchange rate equals national welfare achievements. But facts are not always fitting right with what one has hoped. Even if the target level inflation can be reached, when the national income doesn't go as smoothly, there would never be a pass-through effect to the economic welfare.

Ueda and Valencia (2012) discussed this matter further with raising awareness about time inconsistency in the monetary policy making. It means there is an inconsistency of the monetary transmission mechanism of a central bank in the country, which mostly happens because the gap between two big goals run at the moment. To put it simple, when a central bank has focused on the financial and monetary stability area and put all of the efforts there, and the government itself has lavished all attention to the output stability, the gap between the two parties can overlap, and it would create an inconsistency in the process of the monetary policy's result making. This kind of double-side policy making is called macro prudential.

The point of this so-called time inconsistency is that when a central bank is not being consistent in implying its monetary policy on two different times, which are ex-ante and ex-post of the transmission process. A central bank fails to focus on just one goal in the policy making. This kind of condition can create an inflation

bias. The uncertainty in financial sector will always be there, especially because the existence of the infamous imperfect information, and the tendency of human beings to be quite the opportunist, but this problem can get wider and reach out to the monetary instrument policy, which ends up being quite ineffective as an institution itself.

Maslowska (2012) also put another thought in this discussion. He gave other example of time inconsistency in central bank. Suppose policy makers, as well as the government and the central bank, release official regulation to lower down the rate of inflation to make it below a certain level, then they change direction halfway for another policy purpose, which is increasing the real output (GDP) or aggregate output in the short run. It can indeed be avoided by the independency of the central bank, but the government's role in all this, that sometimes even doubting the central bank's decisions creates more burden. The example taken from the real life inconsistency can be witnessed from how the government handles Asean-China Free Trade Agreement on top of all other regulations.

ACFTA came into the surface on 2002, and began to actualize its activities in Indonesia in 2010, while it is still 5 years ahead for countries like Cambodia, Laos, Vietnam, and Myanmar. It slowly lessers the tariff of trade between Asean and China, and increases the import quota on each other. One of the objectives is to create a progressive liberalization and to raise international trade, mostly in Asia, and also to create a transparent and smooth investment process. Indonesia sensed a chance of gain in this agreement through lesser tariff in exporting goods to China. But there is never enough surprise in how economy works. From Indonesia and China's export performance from before until after ACFTA (2007-2011) it showed quite a rise of the export for both countries. However, the gap

between the two also started to get wider, as China is the leading man in the game while Indonesia still left behind, trying to catch up. The same case happened in the import performance, as Indonesia had bigger portions than China in importing goods from one another. From this we safely assume that China clearly gains more advantage from ACFTA (Directorate General of International Trade, 2010: Dewitari, et al, in Herawati, 2010).

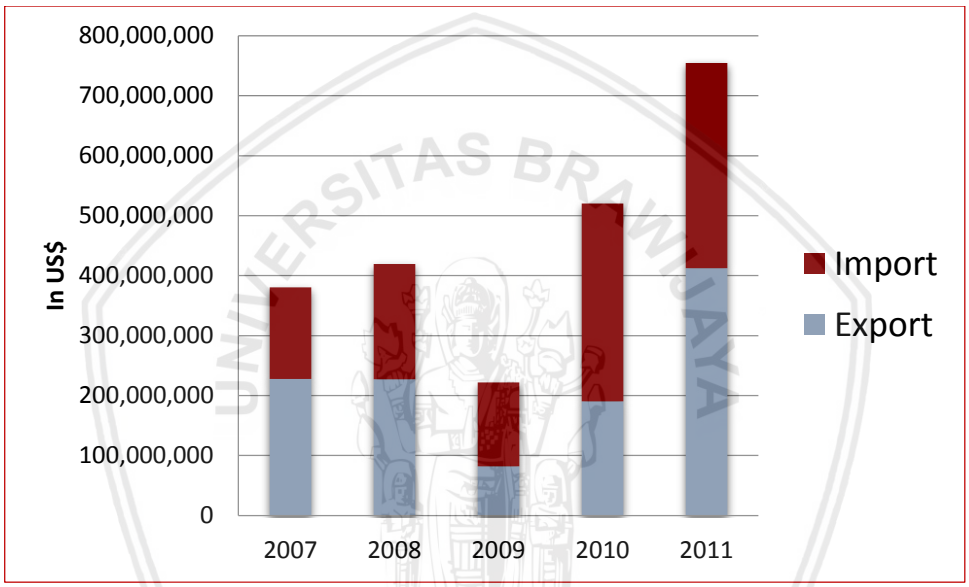


Figure 1.2: **The Comparison of Export-Import between Indonesia-China**

Source: Ministry of Industry, 2013 (modified)

While Figure 1.2 tries to show the start-to-wider gap between China and Indonesia's export-import portions, Figure 1.3 shows the clearer gap between them, in percentage. Indonesia gains around 31% from the trade, while it lost around 69% from the import amount.

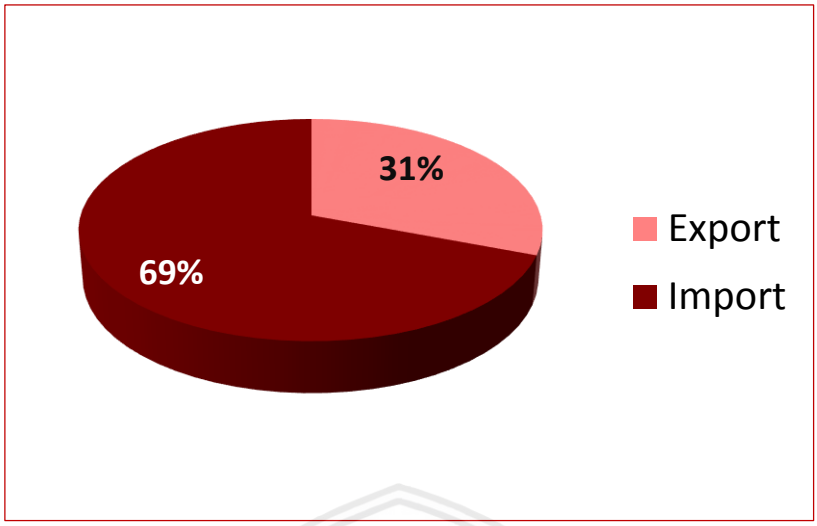


Figure 1.3: **The Comparison of Export-Import between Indonesia-China in Percentage**

Source: Ministry of Industry, 2013 (modified)

Out of all commodities that being traded through this free trade agreement, food is the one that brings out most notable amount of goods cross the sea. Before the ACFTA, Indonesian import of food commodities reached 139.507.363 USD, while after the agreement, it topped 342.117.050 USD. That is quite a considerable rise in the import, which almost double the previous amount. Food plays an important role in the free trade game, and the most traded food from China to Indonesia are homogenized vegetables prepared as infant (or dietetic) food for retail sale, in containers of a net weight not exceeding 250 g (8.83 oz.), not frozen. That is quite a tragic way to say that China wins the game in food sales competition, given the fact that Indonesia is a tropical country which has the upper hand as the natural abundant agricultural resources (Ministry of Industry, 2013).

Brilliantly stated, food has the first claim on the budgets of human beings. When food prices experience a rise, people with income only slightly above the critical level of income tend to reduce their consumption in order to still get essential

food items. That is enough to explain that food price, whatever the form of the good is, stays paramount for economic agents. Food price also one that fluctuates a lot over time, as it influences and at the same time, being influenced by so many shocks an external factors, from the most relevant one like harvest problems, until the furthest relevance possible, like political issues. The volatility of the price makes most central banks tend to leave it out of the inflation rate measurement (Candrasekhar, 2013; Davis, 2012).

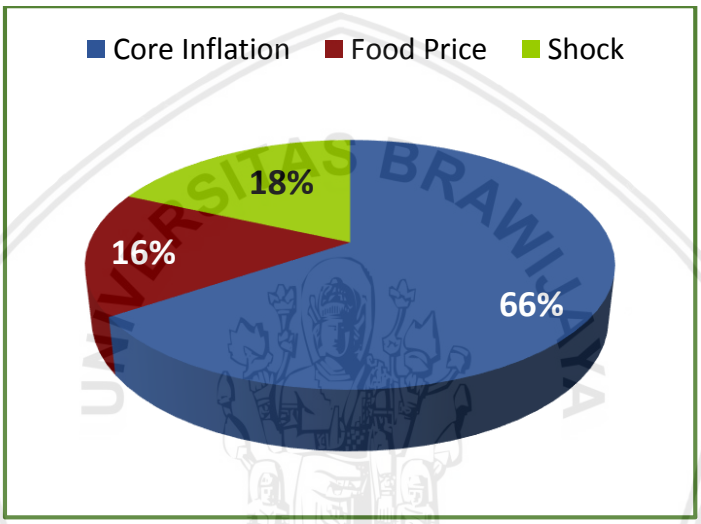


Figure 1.4: **CPI Weights From Three Categories**

Source: Jurnas, 2011 (modified)

Figure 1.4 explains that CPI basically weights from three categories, which is core inflation, food price, and shock. Core inflation is the only prices being included in the inflation rate measurement by most central banks, and non-core inflation usually always be the odd one out, because of its heavy volatility. From 100%, food price holds a 16% part in building the inflation rate. That is, undoubtedly, affect the inflation rate quite a big, considering the rest of 66% and 18% consist of many other form of goods, from oil and electronics to metal goods. That can be said that even though it is not being a part of inflation rate

measurement in many countries, we can not abandon the fact that food price holds a significant influence over it, despite its volatility.

Figure 1.5 displays more explanation of the comparison between all-item inflation and all-food inflation. The green line stands for inflation in general, the blue line stands for food, beverages, cigarette, and tobacco, while the red one is a symbol for food ingredients. Food has two colours because of its differences in influence over the inflation rate. The most volatile good is food ingredients, even though food and beverages also fluctuate more than inflation in general. One moment when it is being an exception is after 2009 era, when the global financial crisis took place in Indonesia (and almost all other countries).

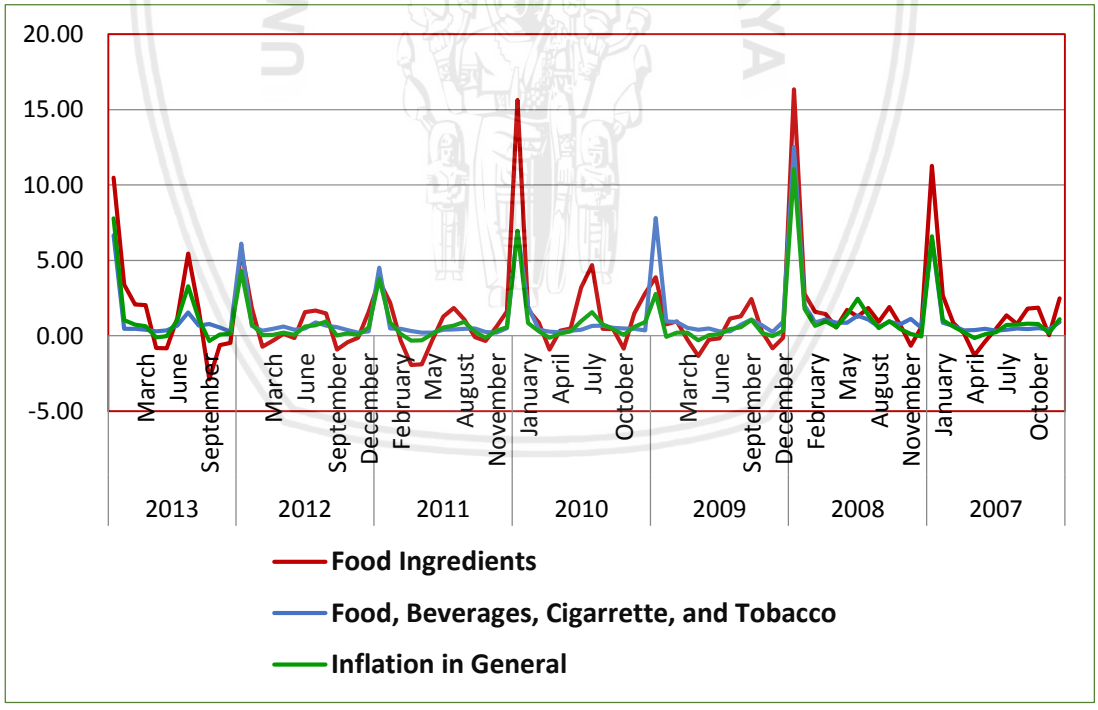


Figure 1.5: **Inflation: All-Item VS All-Food**

Source: Central Bureau of Statistics Indonesia, 2013 (modified)

From all the data presented above, we can land to a conclusion that as Maslowska and Ueda and Valencia warned before, time inconsistency does happen in the real life. Two regulations together do not always get along well. When the central bank wants to achieve its inflation target as Indonesia is currently adopting inflation targeting network as its policy, and at the same time the government attempts to work on another regulation that overlap one another, the result can be not so good. Regulation always has a good objective as a main goal, but when it prevents other regulation to achieve the sole purpose of it, things can turn out ugly afterwards. ACFTA is being created to maximize China and Asean countries' potentials in international trade in the first place, but when it crosses other regulation in the process, the government must prevent even worse implications in the future.

Previous studies had found that central bank credibility indeed heavily depends on the inflation, whether or not it matches the target. Popular studies that began from Kydland and Prescott, until a giant leap made by Smet and Wouters, and recent discoveries never once stated about the relationship between central bank credibility and 'other' government regulation. Taylor's discussion of rule vs discretion also did not touch the import's effect to central bank credibility. Ibrahim, et al had done a research of ACFTA and admitted that it does indeed have an impact to inflation rate, but not as deep, yet. Through this research the author wishes to figure out how regulation, which is ACFTA in this case, affects the central bank credibility through inflation rate.

1.2 Research Problem

1. How the regulation affects central bank credibility through inflation rate?
2. Does a paradox really exist between those two regulations?

1.3 Objective

1. To understand how the regulation affects central bank credibility through inflation rate.
2. To investigate whether or not a paradox really exists between those two regulations.

Chapter II

LITERATURE REVIEW

2.1 Monetary Policy and Credibility

2.1.1Layered Dimensions of Credibility

Henckel, et al (2013) from the Australian National University stated that it is actually possible that forecasts do not affect any mechanism of inflation whatsoever, in which the changes in the expectations would also be irrelevant. He later defines two types of credibility, official target credibility and anchoring credibility. When the actual inflation matches the target rate, it can be said that a central bank has a high credibility. But when what happens is the opposite, it loses its credibility as people would not trust the monetary policy the central bank gives anymore. It's called as the first, while the later refers to the power that the central bank hold to match the actual inflation with the target released previously.

Of course there are some requierements needed. The most important thing is the inflation target that the central bank must have that is released to all the country's economics agents in order for them to acknowledge it, and second, the central bank must stir its BI rate in order to be able to push the inflation rate towards that goal. Henckel, et al (2013) conducted a research that focused mainly about how the European central bank actually holds a good deal of official targeting credibility. Most of the severe losses happened mainly in countries like Portugal, Ireland, Italy and Greece.

Interesting transmission channel and the effectiveness of dual monetary system in Indonesia allured Ascarya (2012) to drown oneself into. One of the unique nature of Central Bank of Indonesia is the dual monetary system, where

Islamic and Conventional system find their way together to the bank. Whether or not this kind of system works, all depends on which is which. The conventional system, which means to the monetary system where there are all things prohibited in Islam, such as interest rate, has undoubted link to the inflation. It means that interest rate has transfer effect to inflation, while the Islamic system rate, which is the rate of profit, doesn't.

Another unique nature of Central Bank of Indonesia (CBI) is its decision to raise the interest rate while all other countries tend to do the opposite. In the beginning of this kind of decision being applied, most of the voice came out were in a negative note. Though in the end, all the doubts were proven incorrect, because it actually eliminates all the negative predictions people were undergoing. In fact, this kind of policy lift the country up from sinking in the dark moments back in 2005 (when Boediono was still the minister) when the interest rate raised until it reached 12%, or when the rise of the global capitalism took place in last 2008.

Why 'layered' dimensions of credibility? Because when we are talking about credibility, it's not just about how actual inflation does not match the inflation target, but also the components in it that are, indefinitely, paramount. Different system, different type of credibility enhancement. There is also different monetary transfer mechanism. What it really means is that a process where begins with the policy introduction until where the BI Rate slowly adjust and the result of the policy is starting to be shown is called a transfer mechanism. In other words, any changes the inflation has that was part of the impact of BI Rate fluctuations is knowingly called as the monetary policy transmission mechanism. It explains the executions made by Bank Indonesia through its changes in policy instruments and their target while affecting both economic and financial sector before particularly give any impact to the inflation rate. We can oversee this mechanism by observing the

connections between the central bank, the banking system and financial sector, and the real sector. Variables that are affected by this mechanism also indirectly have interactions with inflation rate.

A time lag commonly occurs in the work process of the monetary policy transmission mechanism. The variation in it highly depens on which channel it currently works on. Typically, there is channel that can operate in a flash, more than the others. Some channels have been affected drastically through interest rate. Even more so, the speed of monetary policy transmission influence situations in the financial and banking sector. Altough when the banks sense any sign of economic turmoil, its response will not be quite as fast anymore, in terms of responding the the BI Rate. Moreover, increasing banks' capital position will ultimately go towards the direction of reducing lending rates and boosting demand in credit sector, in which they will not put the lending response in any danger. On the other side, economic agents will not automatically increase their demand for credit when the lending interest rate is low, if the economic performance is not that super. From this we can conclude that all sectors in economy actually contribute to the success or the failure of monetary transmission mechanism.

Credibility is paramount for Central Bank of Indonesia in succeeding its monetary policy, not only for economic agents not reacting outside what is expected (and create liquidity trap), or for them not to having backward looking behavior instead of the forward looking one, but also for the sake of all the regulations. The main reason the regulations are made is to take the inflation under control. Not only for it to be under the central bank's little finger, but also for not creating negative trade off between many other macroeconomics variables, such as output gap or exchange rate. And this is exactly where the vigilance of the

central bank takes over 24/7, because once it has wrong diagnosis and prognosis, the effect could be bigger than just a little shock in the economy.

Output gap is chosen as one of the main indicators that can fully show how well the monetary policy works because when it grows bigger as a number (in a positive note), the risk of inflation would automatically becomes higher as well. And when that happens outside the central bank control, the national welfare would also get disturbed. Backward looking behavior tends to be the source of fear for central bank because the inflation persistence would be harder to handle and solve if people still hold onto the past inflation. The more persistent the rate of inflation is, the more difficult it would be for central bank to adjust its level to the original target one, or to the requirement of today's economy. And that would definitely be a Dr. Seuss' nightmare for any country that adopts inflation targeting framework.

Central Bank of Indonesia can also give its two cents and another consideration to the government through Government Expenditure and other form of policies which have any relation with this specific goal of the central bank. At the same time, the government is also possible to attend the meeting between the central bank governor and its elite staffs, though without any vote being taken. Therefore, independency implementation is heavily influenced with a reasonable and proportional working relationship by both the government and the central bank together, and also another elite institutions, which obviously while holding different goals each party (Central Bank of Indonesia, 2013).

2.1.2 More to the Credibility: The Main Issue

Credibility is always an issue for a central bank, no matter what kind of policy it's currently working on. Tanaka (2013) suggested that it's not only the monetary authority and economic agents' perspective that determine one's

credibility, but also its financial strength. It is necessary for central bank to conduct a monetary policy while being strong financially, in which the bank's profit affects its balance sheet. Credibility of a bank means that economic agents truly believe the capability to maintain stable performance throughout time. Even when the capital goes towards negative state a credible bank would not immediately go bankrupt. Even so, the bank would gradually ran out of liquidity, and over the time would deem themselves in dire need of cash, and ultimately will lead themselves into bankruptcy. Likewise, the same also applies to central banks. Even though central banks have the capacity to create liquidity that they need, so naturally it simplifies things for them.

With that being said, central banks still need to possess capital in some way to hold their credibility up. There is this condition that less capital would generate less profit. The advantage of being able to create liquidity can be the solution for them whenever problem arises. But it need to be taken into consideration that tight monetary policy does not go along well with easing monetary policy like that, by producing more liquidity. So, possibility of inflation rate getting out of control can still take place if central banks use this strategy in conducting their monetary policy, thus put their credibility state in danger.

In his previous paper, Blinder (1999) suggested that credibility actually only exists in theory realm, even though it is believed to also matter in real life. The main issue Blinder presented is the difficulty to measure credibility and put it in exact number, which reflects a true state of peope's trust into the central bank. So why, and how that happened? Blinder also proposed to try answering why credibility is crucial for central bankers, and how to maintain it truthfully.

No doubt Blinder is one of the greatest economic analysts in this era, especially when we talk about cental bank credibility, but when deciding about the

definition of credibility, everyone seems to agree that it's not that easy of a matter to determine. Just like Forder (2004) tried to explain once, that the word credibility itself hold various meanings behind. Several definition of credibility arises when we look into it, in language dictionary. The first word came up was trustworthy, and further followed by the word believable. We can safely conclude that credibility is actually a matter of trust, or that it reflects the true character of someone and some company. In addition, credibility shows how intelligent the policymaker seems to be in the eyes of economic agents and how it affects their understanding of each monetary policy released by it.

To create a fairly high credibility, CBI has to dig deeper to its own pocket. There is always a price for everything. If institutional transparency needs more creative innovations such as technology (in releasing financial reports and the smooth information transfer), then the enhancement of a credibility creates what it is to be called as monetary cost. Espinoza danTsomocos (2013) introduced this kind of cost in last April. According to them, monetary cost in a monetary context is a cost that is related with short term interest rate. For example, a cost which takes place in between the current interest rate with the trade value, or asset prices.

Essentially, monetary cost acts exactly just like transaction cost. Those two are basically the shadow and its owner, as the characteristics and action prediction is very similar. Espinoza and Tsomocos (2013) mentioned that if the transaction cost is a funding cost or cash withdrawal by intermediaries (such as banks), then a monetary cost would be a cost which arise from the policy from which the funding decision came out. In the last May, 2013, CBI released a statement that we have a financial surplus, which indicated from the decline of the monetary cost. It's quite a news for Indonesia, as from these past three years, the CBI balance sheet is on

a deficit situation. This surplus happens because the monetary cost continues to decline during 2012, which caused by the rise of the excess of the currency absorption through the monetary operation, such as foreign exchange and the decline of BI Rate.

Lindner and Mihailovci (2013) stated that if central bank is not focusing the work on good governance, then it would suffer bigger chances to face natural risks such as strategy, economy, operational, and institutional risk, both in long and middle run. They later split good governance to three branches, which are: good governance for economy and institution controlling, external good governance where the central bank conducts a good leadership with other countries, and internal good governance where the central bank does various changes in institutionally and operationally.

2.2 Inflation, Food Price, and Shock

2.2.1 The Inevitable Relationship

Davis (2013) found that not only core inflation has its effect to the overall inflation, which obviously leads us to commodity price, such as food or energy price. Non core inflation is often left out by economists trying to measure the rate of inflation, as its volatility that happens almost every time. Food and energy price are very easily influenced and changed, and are the heaven place for shocks to land onto. Not only in Indonesia, shocks in food and energy price happens practically everywhere in the world, across nations. Davis used a method that can put fluctuations in inflation to the inflation measurement, using the large-scale DSGE model, and obviously, incorporate transitory shocks as well.

What's found in the end is quite a shock as well, no pun intended. Davis (2013) investigated 6 countries, such as US, UK, Canada, Norway, Switzerland,

and Sweden. All six countries showed different results before and after a monetary regime changes. When it's before any change was made in the monetary system, the food price (or transitory shocks in food price) had a heavy effect on the rate of inflation through the non-core side, while after the regime was changed, it's not anymore. The reason is that the agentsfailes to indentify between trend and cyclical inflation, which often happen and wrongly treated as one another. Other reason is that after the monetary regime changes, the expected inflation is better anchored.

One can not go ahead and forget the theory. Bradley, et al (2013) described inflation rate as one of the main reason behind human's economic decisions. Whether it is temporary or permanent, this variable stays as important as one's limb. While another time, Labonte (2011) stated that inflation is a fluctuations or a stagnation in price level generally in term of the value of money, whether it continuously rises or declines. Following this definition, three notes had been made to explain the meaning further, and in order not to get confused with other things. The first one is that any changes in the price level in general could be referred to as inflation. It is not applicable when we talk about one price changes in relative of other prices. It is indeed natural for it to happen even though the overall price level appears to somewhat stable. Secondly, what being talked here are not assets' prices, but goods and services. Third, any rise or any decline in the level of price must be significant and not just happen in an instant, but continuously over time, not just in a day or a week worth.

Another inflation management by predicting and controlling offered by Basu (2011), whose statement was that when a wellinformed responsible government or quasi government agency makes an inflation forecast, it can cause the rate of inflation in the future to change. This happens because (in the short run) the actual inflation rate depends on what people expect the inflation rate to be, partly. Inflation

can get worsened by the very fact of higher inflationary expectations and likewise prices can be stabilized to a certain extent by virtue of leading people to expect that prices will be stable.

Reseach about this matter also conducted by several, such as Ueda and Valencia (2012), Martin (2013), Parkin (2013), and Doroftei and Paun (2013). They mainly focused on how central bank independence correlates with the rate of inflation. The former one found that time inconsistency used to happen in central banks that have two main goals, which are inflation (price) *and* financial stability control. It usually happen when a country have two focuses on excecuting policy in monetary sector, and also the output stability. That policy is called macro-prudential. The meaning of time inconsistency is that when central bank is not being consistent at making policy in two different time, ex-ante and ex-post transmission process. Central bank fails to narrow down just one single goal on its policy making. This can create inflation bias, just as stated above.

Others, like Martin (2013) found the opposite. Though central bank independence indeed lowers the rate of inflation, in the long run it seems things aren't as easy as what they look like. Because the independency of the central bank, government can't control the government bonds strategy to relieve some of it's debt—or even covers certain amount of it—and thus creating public debt accumulation. Which end up in a bad note to pay off or accommodate higher financial burden, which is as we can expect: inflation. It happens because in the long run, money growth rate doesn't depend on monetary political authority, but only in the short run. Martin developed models that explain this specific matter, by these equations below:

In other words, lower seigniorage implies a larger debt. No more money to be printed means higher interest rate, and more money to pay for the government

debt. And in turn, when the debt becomes higher, the government gets burdened even more and thus it triggers money growth rate through the payment process of the debt. The monetary policy in the long run remains unaltered. Though it all seems confusing at first, it actually can be said to be the opposite: the permanent rate of inflation can be controlled *if* the central bank and its monetary authority are fully independent of the government debt. No need to accommodate anything if it can actually be achieved in reality.

Parkin (2013) moved from the theory to practice. He conducted an analysis based on actual events and experiments. He suggested two ideas that inflation targeting framework might break loose of its anchor, regarding the institutional arrangements. The first idea is that inflation targeting is beyond the reach of current forecasting capabilities. Everyone is already aware that monetary policy operates with a long and variable time lag, and the consensus (in USA, according to Parkin) is that it takes about two years for a policy action to influence the inflation rate. And between that time, while the policy slowly shows the effect, no one knows what on earth would happen and further influence the inflation rate. Second, just as we all can conclude by now, there is a substansial portion of uncertainty when we are talking about future monetary policy.

As we all know, inflation has its types. Central Bank of Indonesia is currently using the measurement of inflation (through CPI) which divided to 7 separated groups, based on the Classification of Individual Consumption by Purpose (COICOP), which are as following:

1. Food Stuffs
2. Processed Foods, Beverages and Tobacco
3. Housing
4. Clothing

5. Health
6. Education and Sports and
7. Transportation and Communications.

Beside the classifications the COICOP gave, Central Bank of Indonesia also uses other definition that can be referred to as fluctuations of inflation, which published by BPS (Badan Pusat Statistik or The Statictics Bureau). This disaggregation is performed by generating an inflation indicator more illustrative of the influence of fundamentals. Core inflation, non-core inflation, and administered prices are the types of inflation that the Central Bank of Indonesia previously defined.

2.3 ACFTA (Asean-China Free Trade Agreement)

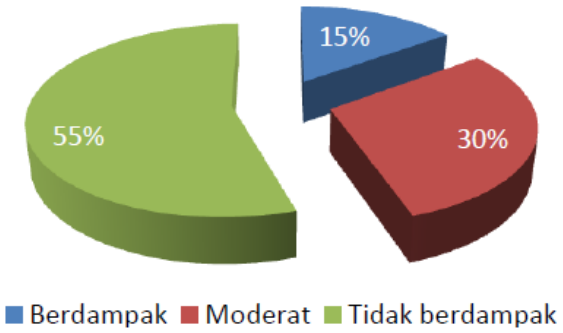
ACFTA was established and finished in 2010, in January. It was basically an agreement of 0% tariff in importing goods from and to China and ASEAN countries, during the period time. The agreement was built long before that, as in 2001 a meeting between China and ASEAN was held in Bandar Sri Begawan, Brunei. China offered a 10 years length proposal that was mainly about an economic agreement between China and ASEAN countries. The very next year, at 2002, the contract were signed, and it was called CEC (Comprehensive Economic Cooperation). From this it is clear that the first intiative came from China's side, despite the ASEAN countries also saw the opportunity in this future agreement (Dewitari, et al, in Herawati, 2010).

The CEC has three main points, which are liberalization, facility, and economic cooperation. The liberalization part includes goods traded, service, and investment. More in the liberalization, this agreement also consists on rules of maintaining the flexibility in Early Harvest Program, which includes living animals,

meat, fish, or another animal products, trees, and vegetables and fruits. Products that are listed in this program are further divided into three categories and would also get a decline in import tariff, which gradually decreasing, and eventually reach zero percent tariff in three years.

Even before the ACFTA, it was obvious how the relationship going on between China and Indonesia, in terms of the comparison of their import quantities, which is overwhelming.The import proportion from China has always been larger than Indonesia. Even before the ACFTA, China was the winner in this competition, so it's not a new discovery if Indonesia's trade balance sheet is deficit compared to China's. From the data found in KADIN (Kamar Dagang and Industry), like an organization for trade and industry in Indonesia, in 2009 the manufacture industry suffered a decline from 28,1% in 2004 to 27,9% in 2008. Is was forecasted that in 5 years ahead, investment in manufacture industry will also suffer a decline in about US$ 5 billions. From all the middle-and-small industries in Indonesia, around 85% of the number (which is 16.806 units as a whole, back in 2008) will face difficulties and trouble in dealing with the competition after the ACFTA taken place.

This problem matters the most for Indonesia, because small-to-medium scale industries hold very important part in the economy. That fact can be explained through three reasons. One, this kind of industry helps creating job offer and employment in Indonesia, one of the most gigantic when we put the matter into its population. Not all the job seekers get to work in the office, and they have to make a living by themselves, through small-to-medium scale industries. Other reason is that it can be done by almost anyone without spesific background education required. In this scale of business, it also doesn't require a ridiculous amount of capital, so everyone can start their own without much worry about the criteria they should pass and experience they should master.



Source: Yusida and Wulandari, 2013 (modified)

Figure 2.1: **Response on The Impact of ACFTA From Manufacture Industry**

From the survey held by Indonesian HSBC from Business Indonesia in 2010 (in Yusida and Wulandari, 2013), most of the participants that came from small-to-medium scale industry felt no significant impact of this ACFTA. The amount was quite a number, which is 55% from total. Around 15% said they felt a difference and an impact through this agreement, while the other 30% is still on the grey side, as they will still see through the moment, what this agreement will bring to them in the next 2-3 years ahead. From all the data shown above, the fact does not fit the theories on how well this ACFTA will do for Indonesian economy, and it's still 7 years ahead from now.

2.4 Relationship between All Variables: How Regulation Affects the Central Bank Credibility through Food Price

The central bank, as well as the monetary policy, holds responsibility for the stabilization of the money supply of a country. Whether the fluctuation happens due to the inevitable shock that can not be avoided, or simply the miscalculation on the government side, the duty still lies on the central bank's hands. The credibility of the central bank can be seen through the gap between the inflation target and the actual inflation. The higher the gap is, the lower the credibility would

be. Credibility in this matter relates to how economic agents behave towards the monetary policy. Public would, hypothetically speaking, follow the instruction the central bank gives if the credibility is considered high enough.

Unfortunately, things are not always happening according to one's expectation. Or at least, not as smoothly.Funny enough, the reason sometimes comes from the same direction: government policy. When the central bank focuses on two goals that is called as macro-prudential policy, it has high probability of losing sight in what really matters, which in economics terms is called time-inconsistency. Simple example would be like when the central bank tries to stabilize both monetary and fiscal side of a country, while trying to maintain output at the certain level. Inflation bias can happen when the government increases the money level in the country to get a satisfied rise number of output, when the central bank aims to lower the inflation rate to reach the target level. This kind of clash doesn't only happen one or twice.

Another set of examples would be the AFCTA matter. The problem arises when the government put domestic business at a stake by implementing quota regulation that clearly advantage other country, and in this case, China. Government decision seems to clash with each other, and sometimes even makes the other overshadowed, overlapped. At the same time, trying to maintain a healthy domestic businessmen going strong while making agreement with China and Asean to a "free" trade looks ridiculous. Why inflation in food price matters in Indonesia? It's actually not only in Indonesia, but food price does make several countries, even developed ones, to think twice every time they want to estimate overall inflation, as it can be put in the variables as a whole, due to the volatile nature of it.

Chapter III

HYPOTHESIS FRAMEWORK

3.1 Conceptual Framework

In the previous section it's already mentioned about how the inflation rate holds a paramount responsibility for the credibility of a central bank, as it's the main reason people can say the bank is credible enough or not. One that determines a central bank's credibility, though, is not only inflation rate. The independency, transfer mechanism efficiency, and even the financial budgeting of a monetary policy each have its role in maintaining a good and credible central bank.

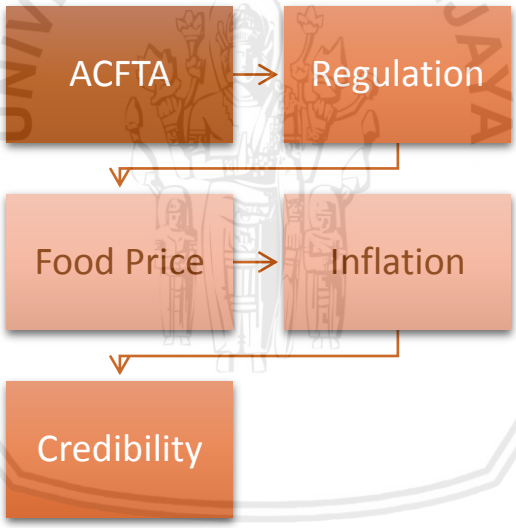


Figure 3.1: **Conceptual Framework**

An independent central bank can make the goal stays in the line even though the government might would want to interrupt in some way. Time inconsistency plays some parts here, as it occurs when there are two goals and two mainsets implemented at the same time, and it can alter the mechanism of the

policy and eventually make the result so biased and unsuccessful. This is the importance of a central bank independency.

So, one thing has been cleared for now. Inflation rate, or in this case, the gap between actual and target rate, holds responsibility for central bank's credibility in a way. But what makes a matched actual inflation rate with the one the central bank released officially? What other factor can alter the actual rate of inflation? However odd it might sound, regulation can come across as an obstacle for the monetary policy sector, say, inflation control. When the regulation from the government focusing more on the output and makes the inflation lowered down, it can ruin the initial goal of the central bank. Low inflation rate is not always the answer of all problems. A stable rate is what the country needs, and as long it is under control and can bend as the central bank want, all will be well. But regulation, in this case is ACFTA, turns out to be an obstacle for the credibility maintaining, because it makes domestic price increases, which in other words, inflation happens.

ACFTA is like sword with two sides of edge. Wulandari and Yusida (2013) found that since Indonesia established 0% tariff in 2010, the country were flooded with China's goods and eventually the domestic business went down. Not only the sales of the domestic goods that was decreasing, the price also increasing due to the international trade agreement. Industries that suffered the most from it were woods, steel, machines, alumunium, food and beverages, art sculptures, camera and optical tools, and other chemical industries. Indonesia was not ready to challenge a one-on-one stage with China's market, because quite a number of domestic industries still lacking in competition mainly because of the asymmetric information.

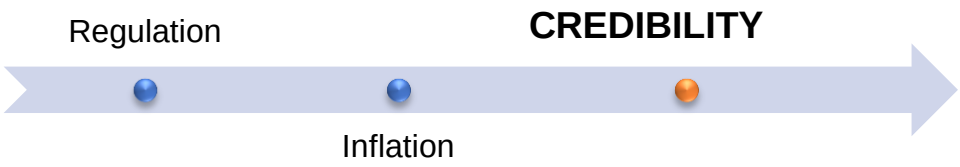


Figure 3.2: **The Relationship between Regulation, Inflation, and Credibility**

By adding regulation through **quota** to the former equation and model of the central bank credibility constructed by Waluyo, et al (2011), the hypothesis model goes to another form below.

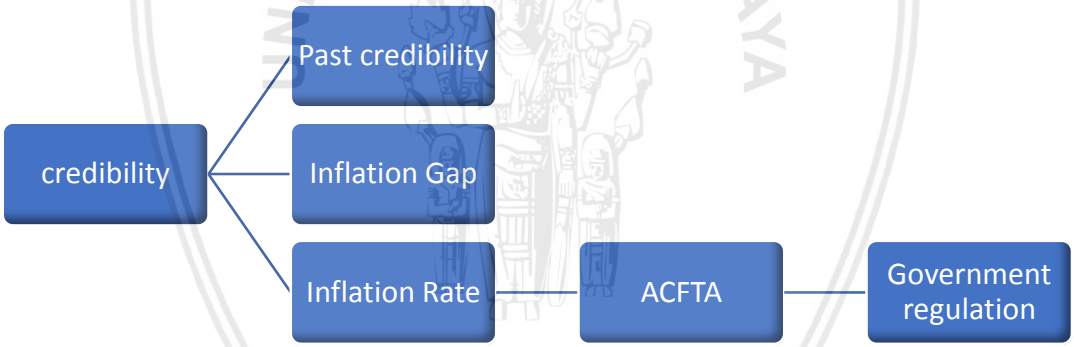


Figure 3.3: **Hypothesis Model**

3.2 Hypothesis

This part will elaborate explanation of an observation this thesis would like to conduct. By hypothesis it means the situation in which the researcher has prepared a theory-based hypothesis beforehand and make sure to discover evidences to support the theory or to do the opposite. Most of the central bank credibility research include null hypothesis on the paper, but this thesis aim not to fly to the same direction, because it's not a commonly accepted hypothesis that this thesis would like to reject, prove, or nullify. It's still uncommon whether or not regulation actually relates negatively to the central bank credibility, as this discussion has never been done before in this light.

Hypothesis states a relationship between dependent variable and independent variable. Dependent variable is the one the model wants to explain, that influenced, though heavily or not still can not be decided early on, by the latter. It measures the event currently being explained. Based on the concept above, the hypothesis framework in this research are as follows:

H1 : variable of future actual inflation, past actual inflation, and dummy of ACFTA each has significant impact on the increase or the decrease of the Bank Indonesia's present inflation rate.

H2 : variable of regulation (through quota) has significant impact, negatively, on the fluctuations of the present inflation rate.

H3 : variable of the past credibility has significant impact on the up and down of the credibility.

H4 : variable of inflation deviation (past actual inflation minus inflation target) has significant impact on the fluctuations of the credibility.

H5 : variable of present inflation rate has significant impact on the fluctuations of the credibility.

Like stated before, the regulation in this matter comes in as the import quota after the ACFTA, during 2007-2012 period. This research would limit the quota only in food items, as the main concern in the research is also limited in that sector. That is due to the condition in Indonesia that a non-core inflation is represented by food prices, as it keeps changing all the time. Food price is often not being included to the measurement of the rate of inflation because its volatility that is difficult to be measured. Through the quota, it can be seen how the government leans heavily on the foreign goods after the ACFTA was concluded.

CHAPTER IV

METHODOLOGY

4.1 Research Type

Despite intense research for over the last 31 years, full agreement on using Dynamic Stochastic General Equilibrium (DSGE) as a perfect model to forecast and make policy advice has not been reached. However in this chapter, a methodology to estimate the relationship between central bank credibility and regulation through inflation rate is presented, using the model in question. Specifically it is analyzed through how the measurement of regulation, proxied by import quota, impacts the inflation through food price, in which the volatility is common for being the cause that non-core inflation is harder to estimate and put into usual inflation estimation. The type of research used by this thesis is explanatory using hypothesis tests.

This chapter is organized as follows. The location of the research will be first introduced, then the source of the data, following by methodology, variables, definition of the operational variables, and finally the order of the analysis technique.

4.2 Research Location

This research took place in Central Bank of Indonesia because the secondary data was taken from Central Bank of Indonesia, with partly obtained from Central Bureau of Statistic (BPS), and World Economic Outlook IMF (International Monetary Fund). This research location is chosen because of several reasons. The first reason, Central Bank of Indonesia is the institution which provides official inflation rate for both the initial target and the actual one, as well as the expected inflation rate. The second would be that the data provided in

Central Bank of Indonesia are complete and easy to get. Lastly, there are few data in which scholars can not conduct the survey by themselves because of the size of the scale, such as survey of the expected inflation and the perception of the central bank credibility to around 2000 companies as economic agents. The research period is limited only during 2007-2013, before the ACFTA that the quota regulation being held and after the agreement being officially made in Indonesia.

4.3 Source of Data

The data gathered in this research is secondary, which published officially by Central Bank of Indonesia, International Monetary Fund (IMF), and Central Bureau of Statistics (BPS), from 2007 to 2013. The type of the data obtained is different each kind, because there are several that released monthly, quarterly, even yearly. But all the data is planned to be organized as quarterly, respectively. All the data consisted of inflation rate (both actual and target), credibility rate, and import quota. The reason why output gap is not listed in this line up is because this research focused mainly on the credibility shown through inflation rate and regulation, as in import quota.

4.4 Data Analysis

Econometrics analysis in this research is using Simultaneous Equations Models, due to the relationship the dependent variables have on each other. There are two approaches to estimate parameters in simultaneous equations. First is single equation method or what is known as limited information methods, which are Indirect Least Square (ILS), Two-Stage Least Square (2SLS), and Limited Information Maximum Likelihood (LIML). As for the second, it's system method that is known as Full Information Method, or Three Stage Least-Square (3SLS) and Full Information Maximum Likelihood (FIML) (Jonaidi, 2012).

The method of three stage least squares estimation, also the one being used in this thesis, is decided to be one the most efficient method in popular works because it is known to be fully efficient since it takes into account all available information in the estimation of the coefficients of a model and then forms weights and re-estimates all the coefficients of the model using the estimated weighting matrix (Umoh, et al, 2012). That being said, the primary concern of this method is not the R-Square, but the constant characters of the coefficients. The use of this approach is mostly practiced for over identified equations.

The advantage of this estimator over 2SLS is that not only it's consistent, but in general it will be more efficient than 2SLS, as it takes into account the presence of other equations in the model. This is done by recognizing that there will be a contemporary variance structure between the error terms in each of the structural equations. To put it short, 3SLS adds error terms all up, which 2SLS doesn't, so the result is more valid and makes more sense than the latter. This procedure uses the method of instrumental variables to produce consistent estimates in the presence of endogenous explanatory variables and it uses generalized least squares to account for correlation in the error terms across equations to produce more efficient estimates (Greene, 2003).

Estimation on central bank credibility will be performed to observe relationship between variables that influence the dependent one. The estimation order is as initial test first, and it will be done using unit root test through ADF Test (Augmented Dickey Fuller) and trend identification. ADF Test is used to identify whether or not the model is already stationer in level, which means that the distribution of the data is in the normal state. After that Durbin Watson Test takes place, as it is the most common test against the autocorrelation of errors in regression models (Dufour and Dagenais, 1984).

The step of the estimation is as follows:

1. Stationary Test
2. Normality Test

4.5 Definition of variable

Variables that are being used in this research revolve around in the monetary policy sector, except for the two main concerns: Dummy and Quota, which both stand as proxy for the government regulation, which is ACFTA.

Table 4.1: **DEFINITION OF VARIABLE**

Name	Symbol	Definition	Description
Central bank credibility	$CRED_t$	1. Perception of the central bank credibility presented in certain number from 0 to 1. 2. The data is obtained through survey held by Central Bank of Indonesia to 2000 companies as economic agent's representatives.	0 = full credibility 1 = no credibility
Inflation target	$CPItar$	Inflation target released officially by Central Bank of Indonesia. The data is taken quarterly from 2007 to 2013.	Inflation target is released monthly by Central Bank of Indonesia, but is taken quarterly in this research due to Taylor Rule theory.
Actual inflation	CPI	Actual inflation that released officially by Central Bank of Indonesia. The data is taken quarterly for period 2007-2013.	Actual inflation is released monthly by Central Bank of Indonesia, but is taken quarterly in this research due to Taylor Rule theory.

ACFTA (ASEAN Free Trade Agreement)	$Dummy$	Dummy stands for the period before or after ACFTA. It becomes a proxy of government regulation.	0 = before ACFTA 1 = after ACFTA
Import quota	$Quota$	Import quota for food that becomes a proxy of government regulation. It is taken from Ministry of Industry during 2007-2013, in the form of differences in quota.	
Error term	ε_t	Disturbance/error term	

4.6. Model Specification

4.6.1. Inflation and Central Bank Credibility

According to previous 3SLS theory discussed above, the specification for central bank credibility with order of variable (variable ordering in 3SLS system) in this research is as follows:

First equation:

$$CPI_t = \propto + \beta_1 CPI_{t-1} + (1-\beta_1)\, CPI_{t+1} + \beta_2 Dummy + \varepsilon_{1t} \quad \text{.....(4.1.1)}$$

Second equation:

$$CPI_t = \propto + \beta_1 CPI_{t-1} + (1-\beta_1)\, CPI_{t+1} + \beta_2 Quota + \varepsilon_{2t} \quad \text{..... (4.1.2)}$$

Third equation:

$$CRED_t = \propto + \beta_1 CRED_{t-1} + \beta_2 (CPI_{t-1} - CPItar_{t-1}) + \beta_3 CPI_t +$$

$$\beta_4 (CPI_{t-1} - CPItar_{t-1})(CPI_t) + \varepsilon_{3t} \quad \text{..... (4.2)}$$

Where:

$CRED_t$ = central bank credibility

$CPItar$ = inflation target released officially by Central Bank of Indonesia

CPI_t = inflation rate in the present date

CPI_{t-1} = past performance of inflation rate

CPI_{t+1} = future performance of inflation rate

$Dummy$ = dummy variable, in which 0=before ACFTA and 1=after ACFTA

$Quota$ = differences/gap between previous and present number of import quota

ε_t = disturbance error/error term

Credibility equation is determined by the deviation of inflation target, which is $(CPI_{t-1} - CPItar_{t-1})$ and the dummy variable, in which the regulation is proxied into two categories, 0 stands for before ACFTA took place, and 1 stands for after the ACFTA being held officially in Indonesia. In equation (4.2) the regulation takes form as the differences between import quota from time to time, which is presented as variable$\beta_3 Quota$.

4.6.2. Identification Test

An equation can be described as:

- Under identified, if the predetermine variables in the equation are less than the endogen variables (K-k < m)
- Over identified, if the predetermine variables in the equation are less than the endogen variables (K-k > m)
- Just/exactly identified, if the predetermine variables in the equation are less than the endogen variables (K-k > m)

Where:

- K = exogenous variables in the model

- k = exogenous variables in every equation in the model

- m = endogenous variables

According to the identification rules above, equation (1.1) have m that equals to 1, K=9, and k=4. If we put it this way, it would be K-k > m-1, which 9-4 > 1-1 resulted in 5>0, so the equation (1.1) is indicated as overidentified. That means there is an omitted variable, or there is an important variable that is not yet being included in the model. As for the equation (1.2), it is clear that m=1, K=9. k=4, which 9-4 > 1-1 resulted in 5>0, so the equation (1.2) is indicated as overidentified, the same as equation (1.1). For the last equation, m=2, K=9, and k=3, so 9-3 > 6-1, which 4>1, so the equation (2) is also indicated as overidentified. Thus, as explained above, it is best to use 3SLS as the estimating method.

CHAPTER V

RESULT AND DISCUSSION

5.1 Hypothesis Test

5.1.1 Stationary Test

Stationary test is conducted to observe whether the data in this thesis is stationary or not. If it is the latter, first differential treatment is needed, in order to get the data to be stationary. In this research the unit root test with Augmented Dickey Fuller (ADF) method is being used.

Table 5.1: Unit Root Test Result Using Augmented Dickey-Fuller (ADF) Test

Variable	ADF Statistics (level)	ADF Statistics (first difference)
$CRED_t$	2.365903	7.337071
$CRED_{t-1}$	2.139706	6.404661
$(CPI_{t-1} - CPItar_{t-1})$	2.127316	6.954721
$Quota$	2.283199	7.786080
CPI_t	2.094807	4.628765
CPI_{t-1}	2.315180	5.827591
$(CPI_{t-1} - CPItar_{t-1})^* (CPI_t)$	1.507738	5.515575
CPI_{t+1}	3.843067	-

Notes:
Critical value 1% : -3.525618
5% : -2.902953
10% : -2.588902
**Significant in all three α, 1%, 5%, dan 10%*

Based on the Tabel 1, it can be stated that all variables are stationary in *first difference*, except for CPI t+1, which is stationary in level.

5.1.2 Normality Test

The purpose of the normality test is to find out whether the data being used in the research is normally distributed or not, in order to not have the result as being biased. It also aims to select which statistical test that will be conducted. To do the normality test, Jarque-Bera test is being used and the result can be shown from Figure 5.1. The normality test using Jarque-Bera came out <5%, which means the distribution of the data using in the regression is normally distributed. As for the P-value, it's >5%, which means the null hypothesis of the distribution of the data being normally distributed is not rejected.

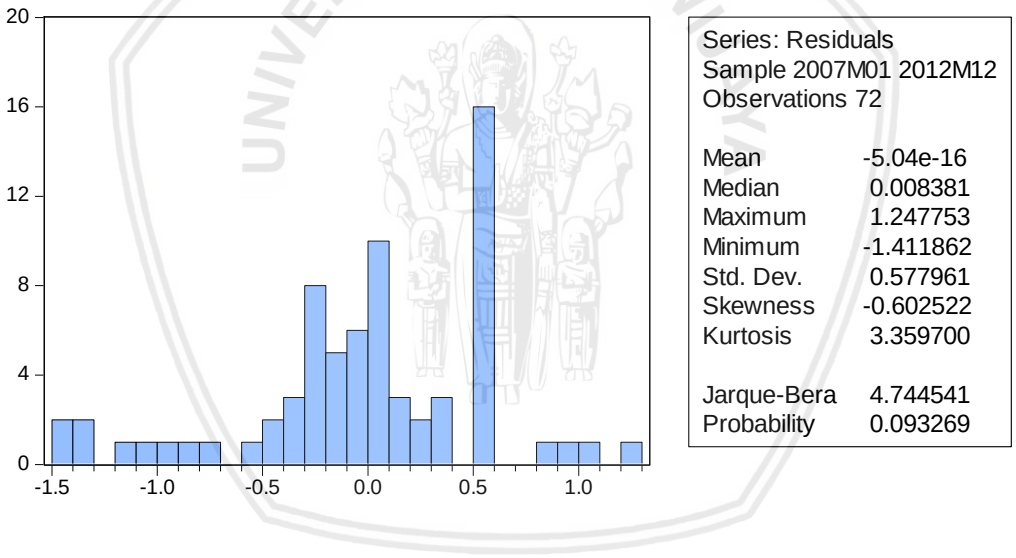


Figure 5.1: Normality Test Using Jarque-Bera Statistics

5.2 Inflation Equation Estimation

The first equation that will be explained is inflation equation, which is divided by two: inflation-dummy equation, and inflation-import quota equation. The result displayed the three equations altogether, which each coefficient named as how it was computed in the estimation, from C(1) to C(13). However, the

interpretation would be separated into two groups, first is inflation equation, which consists of two equations, and central bank credibility as the last model discussed in the estimation result analysis. This section talked about the first two equations: inflation equation.

Table 5.2: Three Stage Least Square Inflation Equation

System: SYS02
Estimation Method: Three-Stage Least Squares
Date: 12/10/19 Time: 11:15
Sample: 2007M01 2012M12
Included observations: 72
Total system (balanced) observations 432
Linear estimation after one-step weighting matrix

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-3.724294	0.048018	-77.56039	0.0000
C(2)	-0.148389	0.023074	-6.431104	0.0000
C(3)	-0.200615	0.021883	-9.167519	0.0000
C(4)	-0.232195	0.040107	-5.789437	0.0000
C(5)	-3.723931	0.048319	-77.06984	0.0000
C(6)	-0.128110	0.026494	-4.835370	0.0000
C(7)	-0.220496	0.025127	-8.775179	0.0000
C(8)	-0.020499	0.005453	-3.759239	0.0002
C(9)	202.4794	147.4692	1.373028	0.1705
C(10)	0.830968	0.425023	1.955114	0.0512
C(11)	68.99966	50.09001	1.377513	0.1691
C(12)	71.30295	53.38555	1.335623	0.1824
C(13)	24.19377	18.10201	1.336524	0.1821
Determinant residual covariance		3.59E-16		

Equation: LNCPI=C(1)+C(2)*LNCPI_T+C(3)*LNCPI_T1+C(4)*DUMMY
Instruments: LNCPI LNCPI_T LNCPI_T1 DUMMY LNIMPORT LNCPI_T_LNCPI_TAR_T C
Observations: 72

R-squared	0.321508	Mean dependent var	-2.881623
Adjusted R-squared	0.291575	S.D. dependent var	0.400511
S.E. of regression	0.337102	Sum squared resid	7.727361
Durbin-Watson stat	0.110739		

Equation: LNCPI=C(5)+C(6)*LNCPI_T+C(7)*LNCPI_T1+C(8)*LNIMPORT
Instruments: LNCPI LNCPI_T LNCPI_T1 DUMMY LNIMPORT LNCPI_T_LNCPI_TAR_T C
Observations: 72

R-squared	0.151992	Mean dependent var	-2.881623
Adjusted R-squared	0.114580	S.D. dependent var	0.400511
S.E. of regression	0.376868	Sum squared resid	9.657982
Durbin-Watson stat	0.070024		

Equation: LNCRED=C(9)+C(10)*LNCRED_T+C(11)*LNCPI_T_LNCPI_TAR_T+C(12)*LNCPI+C(13)*LNCPI_T_LNCPI_TAR_T*LNCPI
Instruments: LNCPI LNCPI_T LNCPI_T1 DUMMY LNIMPORT LNCPI_T_LNCPI_TAR_T C
Observations: 72

R-squared	-2.327448	Mean dependent var	-1.431369
Adjusted R-squared	-2.526101	S.D. dependent var	0.818424
S.E. of regression	1.536829	Sum squared resid	158.2436
Durbin-Watson stat	0.305317		

Equation: C(2)*LNCPI_T+C(3)*LNCPI_T1-(1)
Instruments: LNCPI LNCPI_T LNCPI_T1 DUMMY LNIMPORT LNCPI_T_LNCPI_TAR_T C
Observations: 72

S.E. of regression	0.133203	Sum squared resid	1.242011
Durbin-Watson stat	0.068865		

Equation: C(6)*LNCPI_T+C(7)*LNCPI_T1-(1)
Instruments: LNCPI LNCPI_T LNCPI_T1 DUMMY LNIMPORT LNCPI_T_LNCPI_TAR_T C
Observations: 72

S.E. of regression	0.132077	Sum squared resid	1.221102
Durbin-Watson stat	0.069363		

Equation: C(1)-(C(5))
Instruments: LNCPI LNCPI_T LNCPI_T1 DUMMY LNIMPORT LNCPI_T_LNCPI_TAR_T C
Observations: 72

S.E. of regression	0.000368	Sum squared resid	9.49E-06

5.2.1 The Impact Before and After ACFTA on Inflation

The first equation aimed to show the impact of the ACFTA to the inflation rate, as a Dummy. It explained the implication it has on the rate, before and after the period has taken place. The significance level in the result is divided into three, which are 5%, 10%, and 20%. Any number above 20% of the coefficient's significance level is considered not significant.

Table 5.3: Significance Level of Variables on First Equation

Variable	Coefficient	P Value
CPI_{t-1}	-0.148389	0.0000***
CPI_{t+1}	-0.200615	0.0000***
$Dummy$	-0.232195	0.0000***

****Significant in α 0.05*

It is shown from the estimation result that inflation is affected significantly by all 3 independent variables, which are the inflation rate in the previous time (CPI_{t-1}), inflation rate in the future time (CPI_{t+1}), and the period before and after ACFTA ($Dummy$).The interesting thing is that all variables have a negative impact on inflation rate. The probability for Dummy is not fully significant (0) because no such variable is pure without any white noise interruption, so instead we put it to be 0.00001.

The equation would be shown as:

$$CPI_t = -3.724294 - 0.148389\, CPI_{t-1} + \big(1 - (-0.200615)\big)\, CPI_{t+1} - 0.232195\, Dummy$$

And after the further estimation it would be shown as:

$$CPI_t = -3.724294 - 0.148389\, CPI_{t-1} + 1.200615\ CPI_{t+1} - 0.232195\, Dummy$$

The previous inflation rate has a significant negative impact on present inflation rate. It means that when the past inflation rate increases for 1 unit (or 1 percent, in this case), the inflation rate would decrease for 0.148389 unit.The significance level of previous inflation rate is 0.0%, clearly <5%, thus the H1 is accepted, so it implied that the past performance of inflation rate significantly affected the present inflation rate negatively.

On the contrary, the future inflation rate has a significant positive impact on present inflation rate. It means when the future inflation rate increases for 1 unit (or 1 percent, in this case), the inflation rate would also increase for 1.200615 unit. The significance level of future inflation rate is 0.0%, clearly <5%, thus the H1 is also accepted, which explained that the future inflation rate significantly affect the present inflation rate positively.

As for Dummy variable, which explain the impact before and after ACFTA, it has a significant negative impact on present inflation rate. It means the period

before ACFTA affects the inflation rate more than the period after ACFTA. There is an decrease of 0.232195 unit for inflation rate, before the ACFTA has taken place in the country. The significance level of the Dummy variable is 0.00%, clearly <5%, thus the H1 is accepted (the period after ACFTA significantly affects the present inflation rate in a negative manner).

While knowing that, it should be noticed that the Dummy here stands for the period before and after ACFTA, as a whole. That would mean it reflected the regulation as in all import and export policy, including food import, but not limited as. And the result told us that as a regulation in general, ACFTA did give a positive impact to the present inflation rate, as it lowered down the latter. Although either the import or export regulation that actually did the good job here, we still can not make sure of that.

It also should be taken into consideration that the R-Square is quite low for common regression results, which in this case is only 32.15%. That could mean quite a low impact for most interpretations. But as the method being used here is Three Stage Least Square (3SLS), the exact number of R-Square does not become the most important part of the research. The R-square derived from 3SLS is not comparable to the R-square derived in common regression like Ordinary Least Square since the regression sum of squares and the error sum of squares do not sum to the total corrected sum of squares, and the R-square is not bounded by zero (Greene, 2003). Instead of R-Square, the main concern in the 3SLS estimation method is the constant character of the coefficients.

5.2.2 The Impact of Import Quota of ACFTA on Inflation

The second equation is made to show the impact of the ACFTA to the inflation rate, as Quota. It explained the implication it has on the rate, through the

import quota, especially in food. Just as before, the significance level in the result is divided into three, which are 5%, 10%, and 20%.

Table 5.4: Significance Level of Variables on Second Equation

Variable	Coefficient	P Value
$\boldsymbol{CPI}_{t-1}$	-0.128110	0.0000***
$\boldsymbol{CPI}_{t+1}$	-0.220496	0.0000***
$\boldsymbol{Quota}$	-0.020499	0.0002***

**Significant in α 0.20*

***Significant in α 0.10*

****Significant in α 0.05*

It is shown from the estimation result that inflation is affected significantly by all 3 independent variables, which are the inflation rate in the previous time (CPI_{t-1}), inflation rate in the future time (CPI_{t+1}), and the proxy for government regulation, which is import quota of ACFTA ($Quota$). The interesting thing is that only previous performance of inflation has a negative impact on present inflation rate, the other two, which are future inflation rate and the import quota, both have positive impact.Just as before, the probability for import quota is not fully significant (0.0000) because no such variable is pure without any white noise interruption, so instead we put it to be 0.00001.

The equation would be shown as:

$$CPI_t = -3.723931 - 0.128110\, CPI_{t-1} + \big(1 - (-0.220496)\big) CPI_{t+1} - 0.020499\, Quota$$

And after the further estimation it would be shown as:

$$CPI_t = -3.723931 - 0.128110\, CPI_{t-1} + 1.220496\, CPI_{t+1} - 0.020499\, Quota$$

On the second equation of inflation, the past performance of inflation also has a negative impact on present inflation. It implies that when the past inflation rate increases for 1 unit (or 1 percent, in this case), the inflation rate would decrease for 0.128110 unit. The significance level of previous inflation rate is 0.0%,

clearly <5%, thus the H1 is accepted, which means that the past performance of inflation rate significantly affect the present inflation rate negatively.

For the second variable, it is shown that the future inflation rate has a significant positive impact on present inflation rate. It means when the future inflation rate increases for 1 unit (or 1 percent, in this case), the inflation rate would also increase for 1.220496 unit. The significance level of future inflation rate is 0.0%, clearly <5%, thus the H1 is accepted, and it means that the future inflation rate significantly affect the present inflation rate positively.

The last variable, which proxied as the government regulation (ACFTA) showed a positive impact towards present inflation rate.It means when the import quota increases for 1 unit (or 1 percent, in this case), the inflation rate would also decrease for 0.020499 unit. The significance level of import quota is 0.02%, clearly <1%, thus the H2 is accepted, so it is agreed that the import quota significantly affected the present inflation rate positively.

The result, as we can see, gave a different light compared to the previous proxy of ACFTA. Before, the Dummy showed a negative impact to inflation, which means that it actually lowered down the rate, and all things being equal, is a good sign. But with quota as the proxy of the regulation, is seemed that the result is not the same. And we should take notice that it only happened regarding in the food sector, as the import quota used as the data is only the food import quota. The conclusion we can draw here is that ACFTA has a negative impact on the inflation rate through its food import, but a positive impact as a whole regulation.

This result also showed a link that exists between fiscal and monetary sector, through this regulation. In this case it seems that the relationship is negative, as one brings down the other. But it can not be overlooked that it only

happened in the food sector of the policy. Still, food has a big part in the inflation rate volatility, though in the end it is being left out in the measurement process. And for technical matter, similar thing also happened like in the previous discovery, the R-Square for second inflation equation also reached a low level, which is 36.50%. The same thing also applied here.

5.3 Credibility Equation Estimation

The last equation is the one that 3SLS method intends to elaborate the most. In short, it is the main part of the simultaneous equation.

Table 5.5: Three Stage Least Square Credibility Equation

System: SYS02
Estimation Method: Three-Stage Least Squares
Date: 12/10/19 Time: 11:15
Sample: 2007M01 2012M12
Included observations: 72
Total system (balanced) observations 432
Linear estimation after one-step weighting matrix

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-3.724294	0.048018	-77.56039	0.0000
C(2)	-0.148389	0.023074	-6.431104	0.0000
C(3)	-0.200615	0.021883	-9.167519	0.0000
C(4)	-0.232195	0.040107	-5.789437	0.0000
C(5)	-3.723931	0.048319	-77.06984	0.0000
C(6)	-0.128110	0.026494	-4.835370	0.0000
C(7)	-0.220496	0.025127	-8.775179	0.0000
C(8)	-0.020499	0.005453	-3.759239	0.0002
C(9)	202.4794	147.4692	1.373028	0.1705
C(10)	0.830968	0.425023	1.955114	0.0512
C(11)	68.99966	50.09001	1.377513	0.1691
C(12)	71.30295	53.38555	1.335623	0.1824
C(13)	24.19377	18.10201	1.336524	0.1821
Determinant residual covariance		3.59E-16		

Table 5.6: Significance Level of Variables on Third Equation

Variable	Coefficient	P value
$\boldsymbol{CRED}_{t-1}$	0.830968	0.0512**
$(\boldsymbol{CPI}_{t-1} - \boldsymbol{CPItar}_{t-1})$	68.99966	0.1691*
$\boldsymbol{CPI}_{t}$	71.30295	0.1824*
$(\boldsymbol{CPI}_{t-1} - \boldsymbol{CPItar}_{t-1}) * (\boldsymbol{CPI}_{t})$	24.19377	0.1821*

**Significant in α 0.2*

***Significant in α 0.1*

The result is as follows:

$$CRED_t = 202.4794 + 0.830968\, CRED_{t-1} + 68.99966\, (CPI_{t-1} - CPItar_{t-1}) + 71.30295\, CPI_t + 24.19377\, (CPI_{t-1} - CPItar_{t-1})(CPI_t)$$

Based on the result all variable has a positive impact on central bank credibility. The reason is that the central bank credibility is highly influenced by inflation performance and the forward-looking behaviour of the economic agents. This can provide an evidence against the past discoveries that the behaviour of the economic agents in Indonesia tends to be backward-looking. Thus, H3 is accepted.

Putting this aside, the other variables have significance level below 20%. The inflation deviation or inflation gap has 16.91% probability, the present inflation rate (CPI_t) has 18.24%, and the interactional variable (($CPI_{t-1} - CPItar_{t-1})(CPI_t)$) has 18.21%. All three variables also have positive impact on central bank credibility, simultaneously.

The first variable (after past performance of credibility), the inflation gap, affect the central bank credibility positively. It means when the inflation rate deviates from the target and the gap increases 1 unit (or 1 percent, in this case), the central bank credibility would also increase for about 0.830968 unit. It accepts H4, which implied that the further the inflation rate moves away from its target level, the lower the central bank credibility would resulted.

The most important variable in this equation, the present inflation rate, reflects the impact of government regulation (ACFTA) to central bank credibility, indirectly. The inflation rate has a positive impact on credibility, so it means that when the inflation increases for 1 unit (or 1 percent, in this case), the central bank credibility would also increase for 71.30295 unit. It also fits H5, that implied government regulation (ACFTA) affects the central bank credibility through inflation rate. The period after ACFTA and the increase of import quota in ACFTA does affect central bank credibility though in fact, in a positive manner.

The last variable, the interactional variable between the inflation gap and the present inflation showed a positive relationship as well. It reflected the relationship of the inflation gap and the government regulation through the present inflation rate. Positive sign meant that the higher the inflation gap and the present inflation rate, the higher the credibility would also be. When it increases by 1 unit, the central bank credibility would decrease by 24.19377 unit. It also fits the hypothesis, because even though what it should be is the more out of control the inflation rate is (high deviation), the more the central bank loses its credibility, the rate still has significant impact after all.

But why does it reflect otherwise, though? We should not forget citizen's share of information regarding government regulation and monetary circumstances is relatively low, so therefore the credibility though is indeed affected by past credibility, does not entirely reflect all knowledge that Indonesian citizen has held so far.

5.4 The Comparison With Previous Researches

As the topic about the implications of government regulation with ACFTA as a proxy, to central bank credibility in Indonesia has never been conducted before, the comparison goes to only some parts of the result in the thesis. The variables for the inflation equations and the credibility equation showed similar performance with previous researches, as a whole.

Table 5.7: Comparison With Previous Research

Exogenous Variable	Impact to Endogenous Variable	Previous Research
CPI_{t-1}	Negative	Waluyo, et al (2011)
CPI_{t+1}	Positive	Waluyo, et al (2011)
$Dummy$	Negative	Ibrahim, et al (2010) → briefly mentioned
$Quota$	Positive	Davis (2012), Martin (2013), Parkin (2013) → inflation and food price
$CRED_{t-1}$	Positive	Waluyo, et al (2011)
$(CPI_{t-1} - CPItar_{t-1})$	Negative	Waluyo, et al (2011)
CPI_t	Negative	Waluyo, et al (2011), Henckel, et al (2013), Tanaka (2013)
$(CPI_{t-1} - CPItar_{t-1}) * (CPI_t)$	Negative	-

Ibrahim, et al (2010) already mentioned about the negative impact that ACFTA has on inflation rate, but it was only briefly discussed. No other research has ever talked about this topic yet, not as a whole regulation or in parts, like in this thesis, which did both. All variables beside proxy of ACFTA has similar result to inflation rate, according to previous researches. The same did not happened with all variables for credibility equation, excluding the interactional variable.

5.5 The Relationship Between Government Regulation and Central Bank Credibility

Discoveries found in this research are highly focused on the government regulation's impact on the central bank credibility. There are three equations, which the first two reflected the government regulation side through ACFTA to inflation rate, and the last reflected the impact it has on the central bank credibility.

From three equations above, it should be made clear that inflation rate and credibility does get affected by ACFTA. The import quota showed that it mattered, because the inflation rate went up when the quota increased, although the period before and after showed an opposite statement. The period before the ACFTA showed more significant impact on the credibility, than the period after. As the quota used as the data in this research is limited to food sector only, it tells us how the increasing quota (after ACFTA has taken place) affected the inflation rate through non-core sector.

The volatility of the food price is one the main reason why the food price is not being included in the inflation measurement by Bank Indonesia. Food price is often not being included to the measurement of the rate of inflation because its volatility that is difficult to be measured. Through the quota, it can be seen how the government leans heavily on the foreign goods after the ACFTA was concluded.

It then leaves us to the question of whether or not the inflation rate provided by Bank Indonesia covers economic situation that truly happens in the country, because the disturbance created through non-included measurement variable that being left out (like food price) by other government regulation is not reflected in the rate (although monetary regulation and other regulation outside the central bank's capacity is not related in term of the monetary policy and the instruments being used).

CHAPTER VI

CONCLUSION AND RECOMMENDATION

5.6 Conclusion

The model (both inflation and credibility equations) provided evidences that suggested that there is indeed a negative relationship between government regulation and the central bank credibility in Indonesia. It indicates that as the import agreement (ACFTA) is being held, and the import quota becomes higher, the central bank credibility turned out to be lower, through its impact on the inflation rate. These results lead to implications such as follow:

1. Because the import quota to China that being used in the research is limited only to food sector, the influence in the inflation rate and the central bank credibility is also limited to that sector. The inflation rate is not limited to the food price only, because it would not match with the measurement by Bank Indonesia, as the non-core inflation is not being put into consideration. Nonetheless, it showed that government regulation through this agreement had an impact on the inflation rate in a positive relationship. That means, the higher the quota, the higher the inflation rate. It would not end up pretty when the inflation rate is no longer controllable by Bank Indonesia using transmission mechanism instruments, when in reality it still does get affected by other factor outside the central bank's territory.

   In the theory, Inflation Targeting Framework aims for a low and stable inflation, and that is also applied in Indonesia's monetary framework. Inflation is already stretching out from the target level through the years, let alone having another factor that hinders the transmission mechanism process, and on top of that, the factor in question comes from outside the

central bank. It can potentially be a disadvantage for the future monetary policy application.

Inflation rate and the central bank credibility based on the estimation result showed negative relationship. It also matches the theory, as when the inflation becomes higher the central bank credibility would also down to a lower level. Further, the negative sign also indicated that the monetary policy also linked with fiscal policy in some extent, with some limitations. Unfortunately in this case, the relationship is negative.

2. The findings on the negative relationship between central bank credibility and the government regulation indicated the existence of the paradox. Two regulations, both came from one extreme point to the other, which are fiscal and monetary side, proved that they can disadvantage each other's intentions when conducted at the same time. At least in this case. It then leads to another question about the validity of the inflation rate in Indonesia. Non-core inflation, weighted inflation, food price and regulation is related but not measured on inflation rate, so researches about it, using excluded-food price inflation rate does not truly represent the real economic events happen there.

5.7 Recommendation

1. From the latest research about the implications of ACFTA to real sector, it has been found that it did not really bring much advantages to the small-scale business in Indonesia. It can be said that from the fiscal side it did not result in a good light. The same also happened in the monetary sector, as in this research it has been found that it also brings negative result towards the goal of central bank, which is creating a monetary stability, or in short, a low and stable inflation rate. The policy implication from this discovery is

for the government to evaluate its policies, and investigate which one cancels out the other, no matter when the polar is not in the same direction (monetary vs fiscal).

2. This research is limited to the food sector of the import quota, but not the food price. The result would tell us more about the differences between inflation in food price versus general inflation rate that both *resulted* from food import, in a clearer state. And it would show the impact of food import regulation to food price inflation more focused and apparent.

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